(12) UK Patent Application (19) GB (11) 2 079 178 A

(21) Application No 8120567
(22) Date of filing 3 Jul 1981
(30) Priority data
(31) 68065
(32) 7 Jul 1980
(33) Italy (IT)
(43) Application published 20 Jan 1982
(51) INT CL³ F02M 35/04
(52) Domestic classification B1T 1106 1107 1504 1703 1905 CG
(56) Documents cited
GB 1373401
GB 1242478
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GB 1119024
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GB 863736
GB 819629
(58) Field of search B1T
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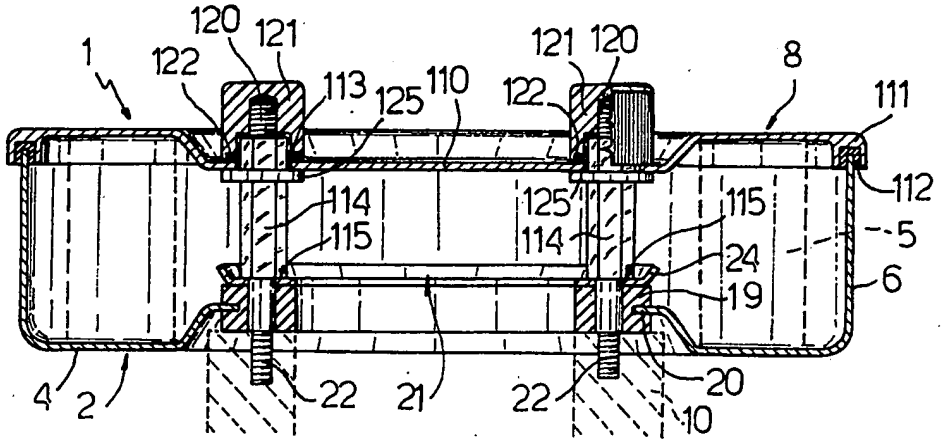
(54) Container for a dry filter element for the air to a carburettor

(57) A carburettor air filter housing is secured to its carburettor by means accessible from the outside of the housing. Bolts 114 secure the housing 8 to the carburettor 10 and preferably carry at their upper ends threaded caps 121 to secure the top cover of the housing. In other constructions the bolts extend up through a fixed central part of the top of the housing, and an annular top cover is secured by separate screws and/or snap fastenings.

Fig.17



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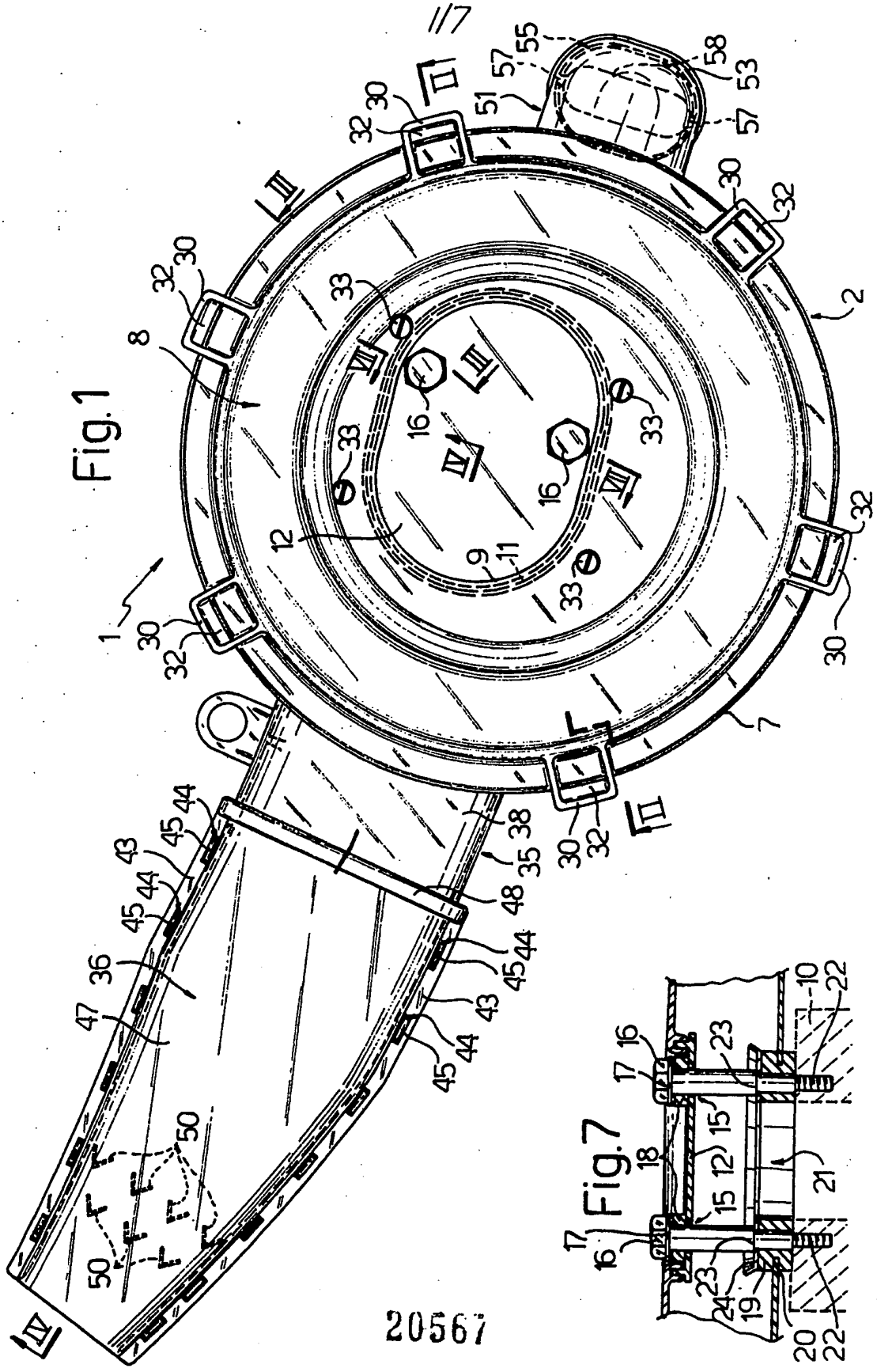

Fig.1

Fig.7

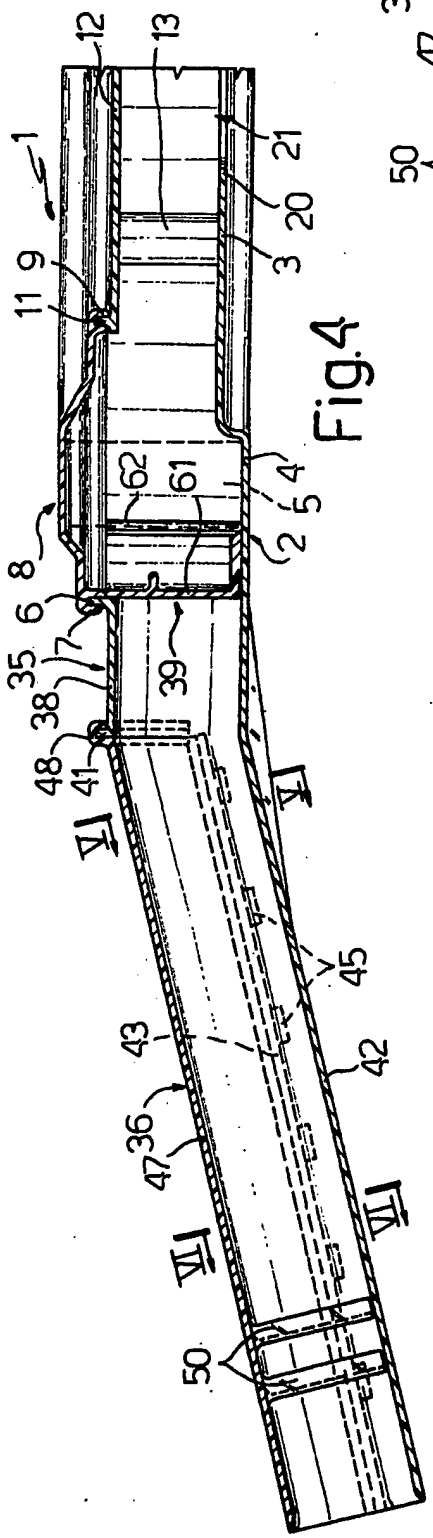

Fig.4

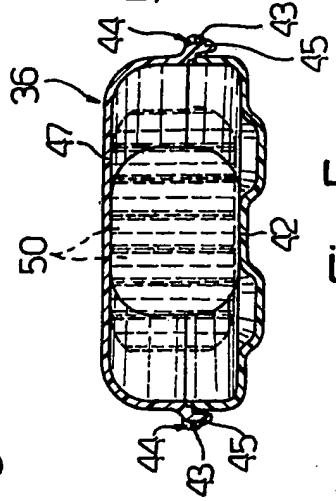

Fig.5

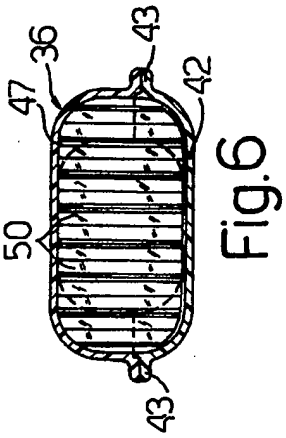

Fig.6

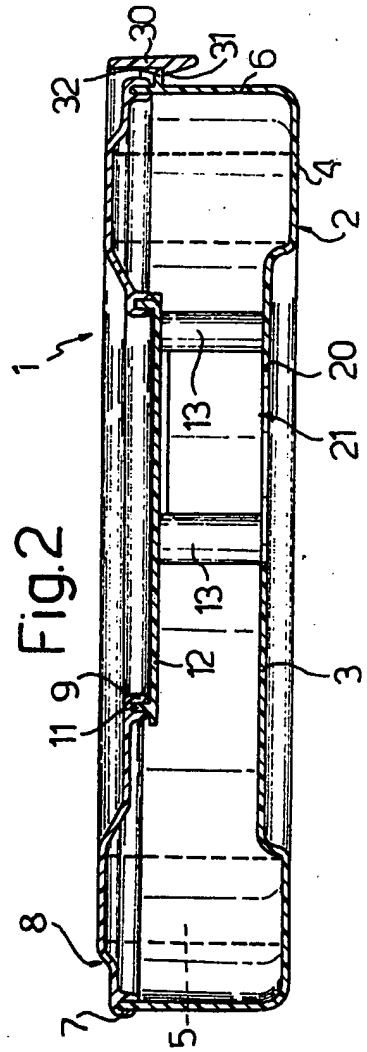

Fig.2

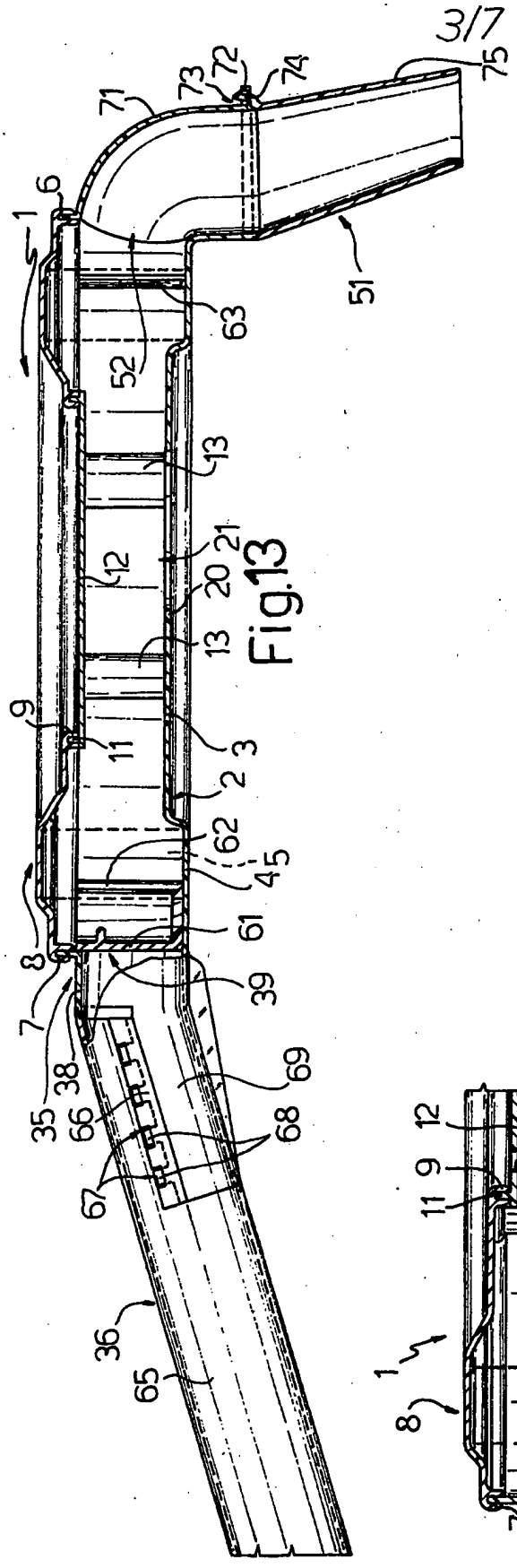

Fig.13

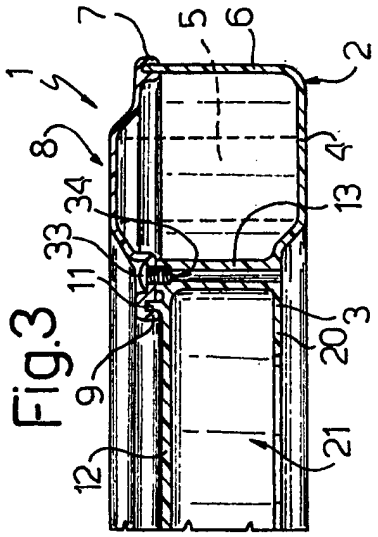

Fig.3

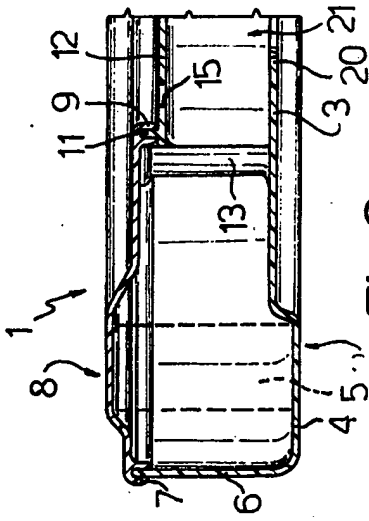

Fig.9

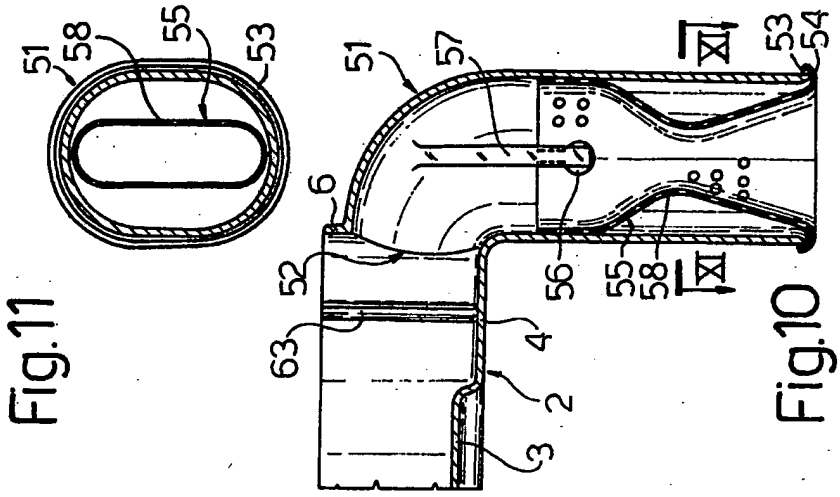

Fig.11

Fig.10

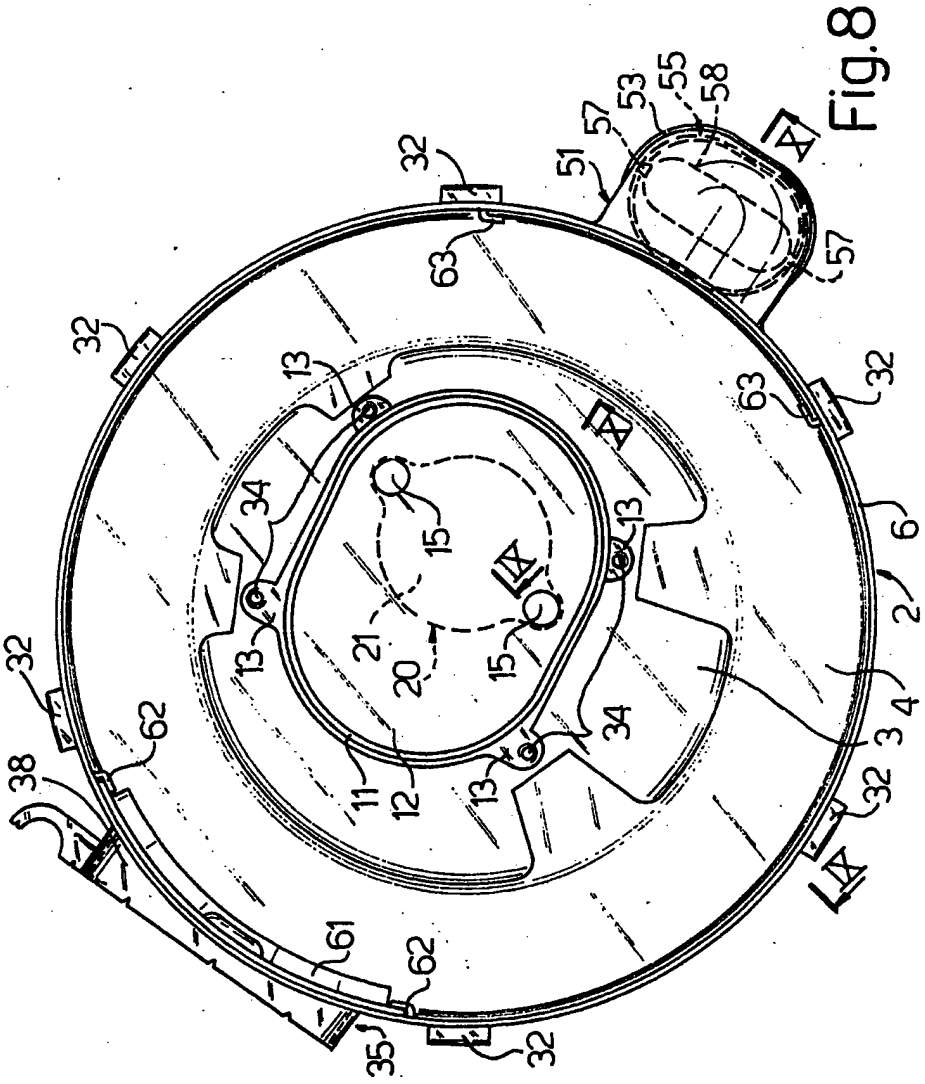

Fig.8

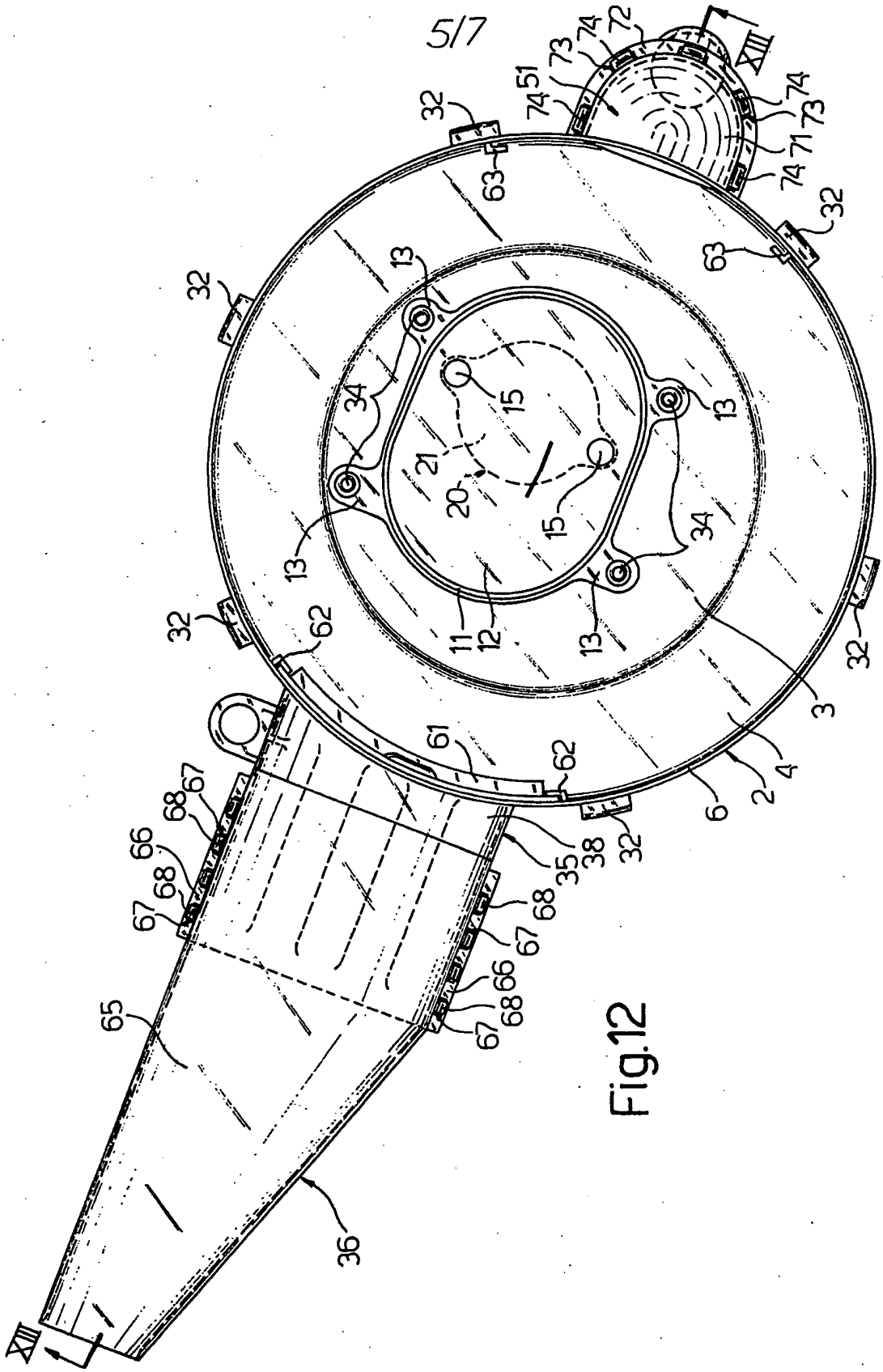
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Fig.12

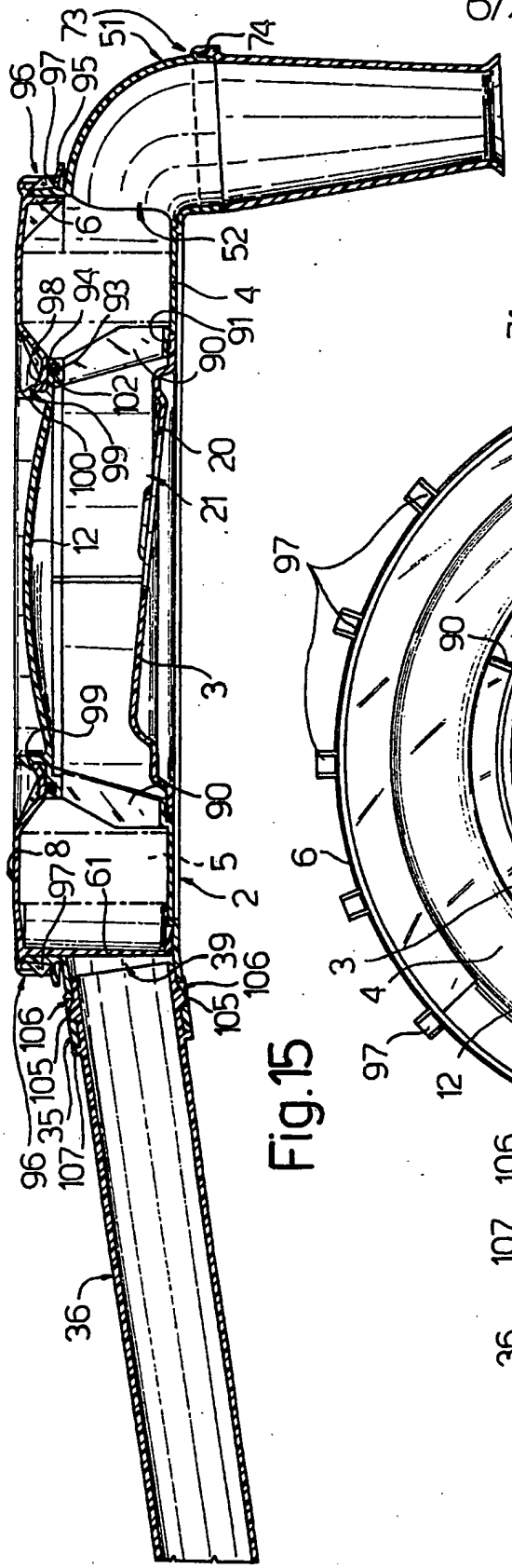


Fig.15

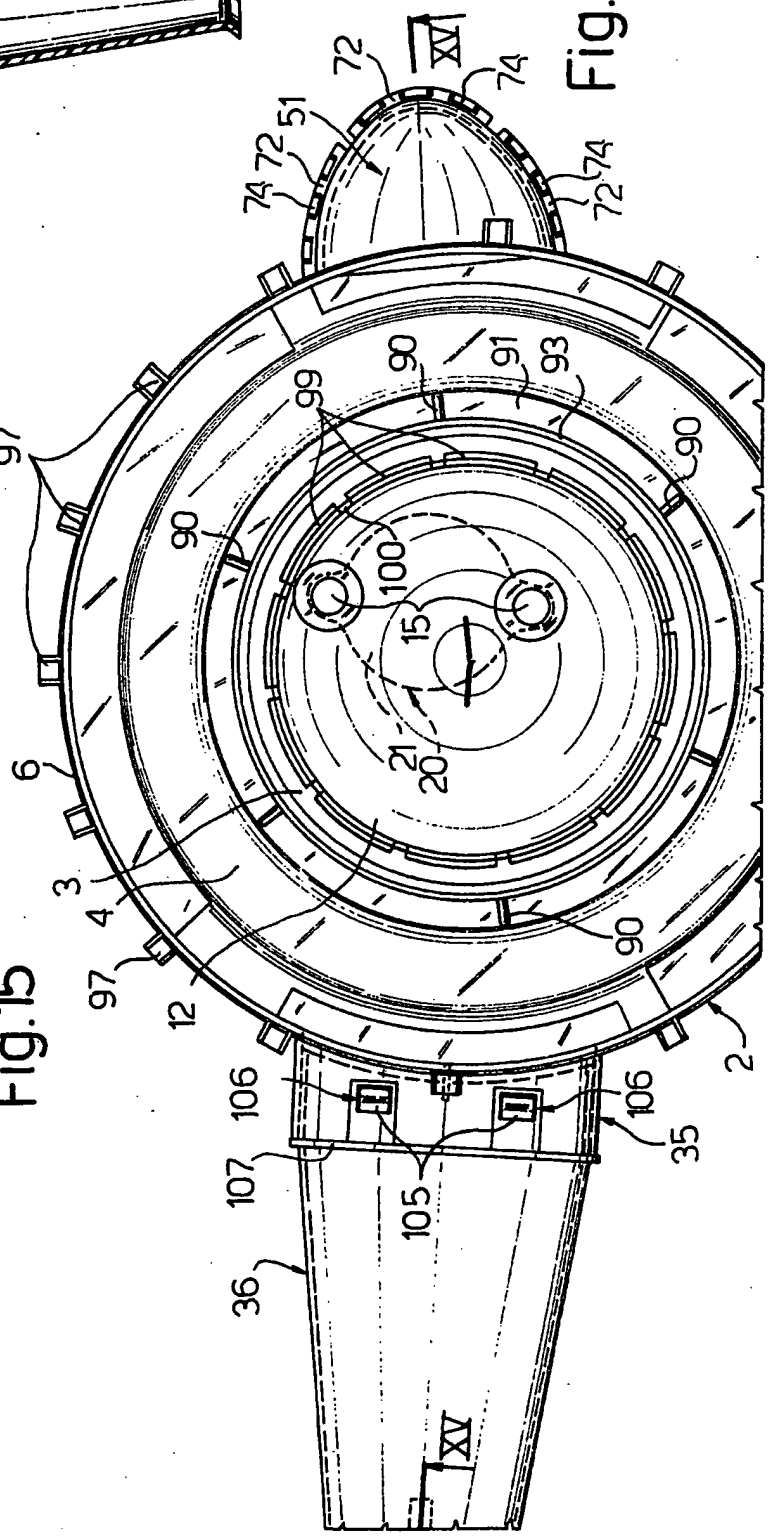
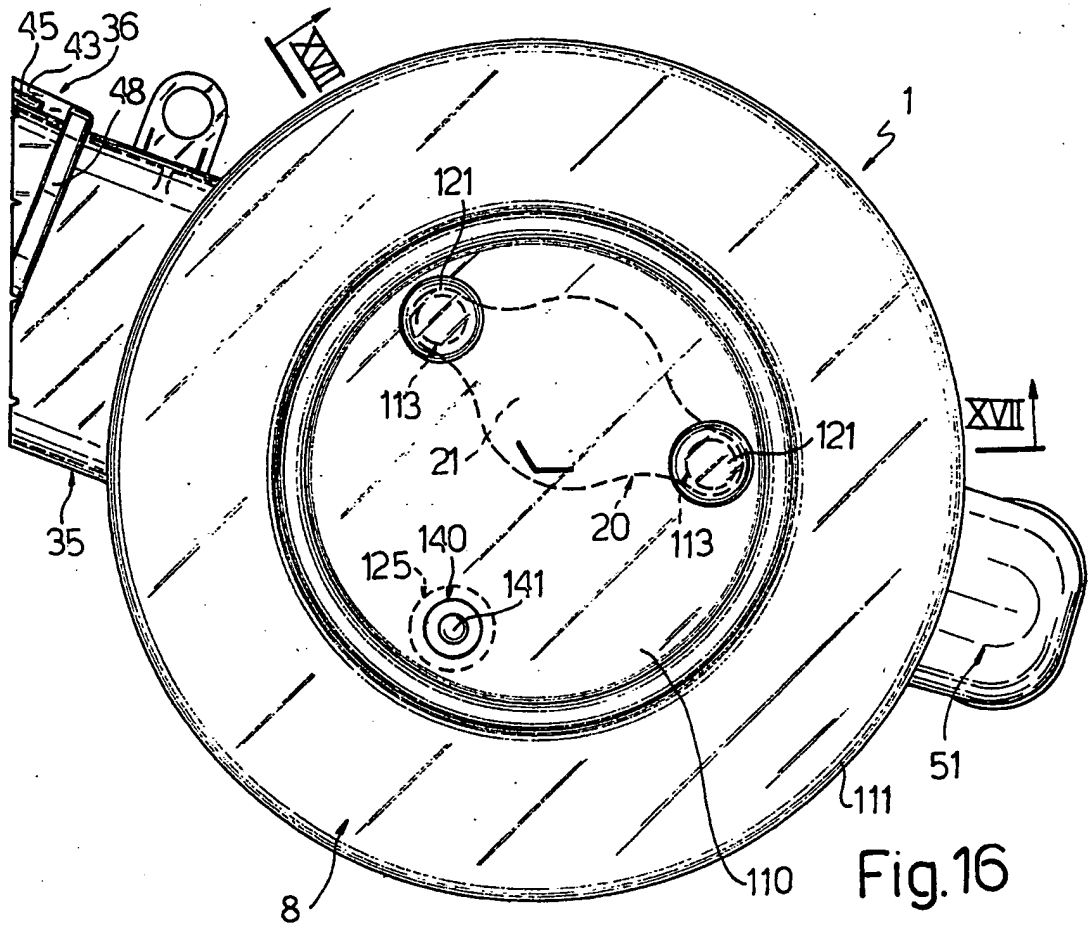


Fig.14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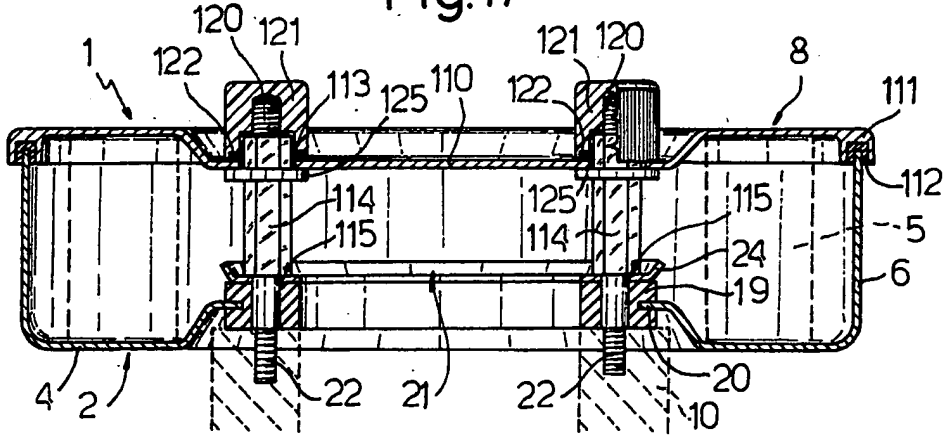
8

Fig.16

Fig.17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SPECIFICATION

Container for a dry filter element for the air to a carburettor

This invention relates to a container for a dry filter element for the air to a carburettor, in particular a motor vehicle carburettor. Such containers normally comprise an outer casing which is closed upperly by a cover, the container internally containing the filter element, which is generally an annular cartridge. Such containers are fixed on to the carburettor by screws which are located on the lower wall of said outer casing, in the inside of the container, and are screwed into corresponding threaded bores provided in the upper surface of the carburettor, or vice versa. The present-day production line assembly of such a container on to the carburettor therefore comprises a series of operations which obviously require a certain time and thus involve a certain cost. In this respect, the container arrives at the assembly line complete, with the cover fixed on to the outer casing in order to hold the filter element, and must be dismantled to give access to the screws inside the container in order to fix it on to the carburettor. When the outer casing has been fixed to the carburettor, the cover must be refitted to this latter by screws or wing nuts, which require a certain screwing time.

The object of the present invention is to provide a container for a dry filter element for the air to a carburettor, which can be assembled much more rapidly on to the carburettor, in order to reduce the production line assembly costs.

Further objects and advantages of the container according to the present invention will be apparent from the description given hereinafter.

The present invention provides a container for a dry filter element for the air to a carburettor, characterised by comprising means accessible from the outside of said container for its fixing on to said carburettor.

The present invention will be more apparent from the description of some embodiments given hereinafter by way of non-limiting example with reference to the accompanying drawings, in which:

Figure 1 is an upper view of a first embodiment of the container of the present invention;

Figures 2, 3 and 4 are sections through the container of Figure 1 on the lines II—II, III—III and IV—IV, with certain elements not shown for greater clarity.

Figures 5 and 6 are sections through the container of Figure 4 on the lines V—V and VI—VI, with certain elements not shown for greater clarity;

Figure 7 is a section through the container of Figure 1 on the line VII—VII;

Figure 8 is a partial plan view of the outer casing of the container of Figure 1;

Figures 9 and 10 are sections through the container of Figure 8 on the lines IX—IX and X—X, with a cover fitted;

Figure 11 is a section through the container of Figure 10 on the line XI—XI;

Figure 12 is a plan view of a second embodiment of the container of the present invention;

Figure 13 is a section through the container of Figure 12 on the line XIII—XIII;

Figure 14 is a partial plan view of a third embodiment of the base part of the container of the present invention;

Figure 15 is a section through the container of Figure 14 on the line XV—XV, showing a complete representation;

Figure 16 is a partial plan view of a fourth embodiment of the container according to the present invention; and

Figure 17 is a section through the container of Figure 16 on the line XVII—XVII.

With reference to Figures 1 to 11, the first embodiment of the container according to the present invention comprises an outer casing 2 of cup formation, with a lower base wall 3 which perimetrally defines a lowered annular wall 4 serving as a lower support for a dry filter element 5 of known type, indicated by dashed lines. Said outer casing 2 comprises an annular cylindrical side wall 6, over the upper edge of which there is mounted an outer perimetral U cross-section rim 7 of an upper cover 8 for the outer casing 2. Said upper cover 8 rests upperly on the dry filter element 5, is of annular shape and has an inner perimetral rim 9 of U cross-section, which rests in a sealed manner on an annular rim 11 projecting upperly from a flat wall 12 disposed facing the top of the base wall 3 of the outer casing 2, and is supported and spaced apart from this latter by means of four columns 13. Said outer casing 2, comprising the lower base wall 3, the lowered annular wall 4, the cylindrical side wall 6, the four columns 13 and the upper flat wall 12, is constructed in a single piece, conveniently of plastics by means of moulding. The lower flat wall 12 (Figures 1, 7 and 8) comprises two bore 15 into the top of which two bolts 16 are inserted by way of a washer 17 and seal gasket 18 disposed between the head of the bolts 16 and the upper surface of the flat wall 12. Said bolts 16 pass through the outer casing 2, and then at their bottom pass through an annular gasket 19 mounted about a perimetral edge 20 of an aperture 21 provided in the lower base wall 3 of the outer casing 2, in a position corresponding with a similar inlet aperture provided in a carburettor 10 indicated by dashed lines. The bolts 16 comprise a threaded end 22 for fixing into corresponding threaded bores in the carburettor 10, and centrally comprise an annular shoulder 23 on which there rests a disc 24 which is bored centrally at the aperture 21 and compresses the annular gasket 19.

The upper cover 8 is fixed on to the outer casing 2 at the outer perimetral rim 7 by means of a plurality of resilient appendices 30 which are disposed about the cover 8, and comprise a lower tooth 31 which is snap-connected to a corresponding outer appendix 32 projecting from

the cylindrical side wall 6. At its inner perimetral rim 9, the upper cover 8 is fixed on to the outer casing 2 by means of four screws 33 housed in threaded bores 34 (Figure 3) provided in the columns 13.

Said outer casing 2 comprises a first connection portion 35 for a first duct 36 through which fresh air is fed to the container 1. Said first portion 35 (Figures 1 and 4) comprises an annular part 38 branching horizontally from a portion of the cylindrical side wall 6 at which there is provided an aperture 39, said annular part 38 comprising an outer rim 49 on its upper half portion, whereas in its lower half portion it comprises a downwardly and laterally inclined semi-tubular portion 42, which constitutes a lower part of the first duct 36. In this respect, said semi-tubular portion 42 upperly comprises a lateral projection 43 in which a plurality of slots 44 (Figures 1, 4 and 5) are provided into which are snapped lower appendices 45 present on the lateral edges of a semi-tubular portion 47 which, when connected to the semi-tubular portion 42 forms the duct 36. At its upper terminal portion at which it is connected to the annular part 38 of the first portion 35 of the outer casing 2, said semi-tubular portion 47 comprises a U-section rim 48 which is fitted over the outer rim 41 of said annular part 38.

The cross-section of said first duct 36 progressively decreases in an outward direction, and at its inlet zone it comprises a plurality of elements 50, the purpose of which is to oppose the exit of sound waves from the interior of the container 1 towards the outside, in order to reduce the noise of the engine fed by said carburettor. Said elements 50 are of substantially V cross-section, with the vertex towards the inlet aperture of the duct 36, the elements being spaced apart in two parallel rows and mutually staggered so that when viewed in projection they form a complete surface barrier inside the duct 36. The height of the element 50 is substantially equal to the complete height of the duct 36, and they are upperly integral with the semi-tubular portion 47.

In a position substantially opposite the first duct 36, the outer casing 2 also comprises a second duct 51 branching from the cylindrical side wall 6 of the outer casing 2 in a position corresponding with an aperture 52, and serving for feeding air into the container 1 at a higher temperature than that fed by the duct 36. Said second duct 51 is bent dowards at 90°, and terminates lowerly in an outer annular rim 53 on to which there is fixed a lower annular rim 54 of a metal mesh element 55 disposed in the second duct 51, and upperly comprising two bores 56 into which are inserted two support appendices of two arms 57 formed inside the second duct 51 and integral with it. Besides constituting a temperature protection device for the second duct 51, which is conveniently constructed of plastics in one piece with the outer casing 2, the metal mesh portion 55 also comprises a portion 58 of reduced cross-section to oppose the exit of sound waves from the interior of the container 1 towards the outside through said duct 51.

Said apertures 39 or 52 can be closed at choice by means of a sector 61 in the form of a portion of a cylindrical surface, and of which the ends are inserted into pairs of guide appendices 62 or 63 provided on the inner surface of the cylindrical side wall 6 of the outer casing 2 (Figure 8).

The embodiment of Figures 12 and 13 differs from that described heretofore in that the semi-tubular portion 42 which forms the duct 36 is of shorter length, in order to constitute only part of the duct 36, which is formed substantially from a tubular portion 65 of suitably decreasing cross-section of required inclination, which, towards the first portion 35 for connection to the outer casing 2, comprises two lateral projections 66 provided with slots 67 into which are snapped corresponding resilient appendices 68 projecting laterally from a short semi-tubular portion 69 which branches inclined from the annular part 38 of the portion 35. The connection between the end of the tubular portion 65 and the annular part 38 of the first portion 35 is not made by connecting together the projecting rims 41 and 48, but by inserting one end into the other.

The second cut 51 is also not formed in a single piece, but instead comprises a first portion 71 integral with the outer casing 2, with which it communicates by way of the aperture 52, and comprising lowerly a lateral projection 72 provided with a plurality of slots 73 into which there are connected corresponding resilient appendices 74 disposed about the upper edge of a cylindrical portion 75 which forms the end part of the second duct 51. Said cylindrical portion 75 is connected to the first portion 51 both by means of the resilient appendices 74 and by inserting one end into the other, at least over a portion of their connecting perimeter.

The outer casing 2, which as stated is formed by moulding plastics material, is constructed by inserting a block to enable the lower base wall 3 and upper flat wall 12 of the casing 2 to be moulded. The block can then leave from the aperture 39 in the outer casing 2, and its movement between the wall 3 and 12 from the moulding position to the exit position can take place along a curved line (Figure 1) or along a straight line (Figure 12).

The embodiment shown in Figures 14 and 15 differs from that of Figures 12 and 13 substantially in that the lower base wall 3 of the outer casing 2 is no longer integral with the casing 2 itself, but is constructed separately, although still conveniently of plastics, and is then fixed to an inner annular rim 91 on the annular wall 4 for lowerly supporting the filter element 5, for instance by ultrasonic or hot blade welding. In this manner, the moulding of the outer casing 2 can be more simple as there are no longer passage problems for the block in constructing the wall 12 facing the base wall 3. In the specific case of Figures 14 and 15, the wall 12 is supported by a plurality of inclined feet 90 formed integral with

and projecting from the inner annular rim 91 of the annular wall 4 and integrally supporting an outer annular rim 93 of the wall 12, this rim housing an annular gasket 94. The two bores 15 (Figure 14) for the passage of the two bolts 16 are provided in the curved wall 12.

In addition to being snap-fitted on to the outer annular rim, the cover 8 is also snap-fitted on to the inner rim in that besides comprising (for the outer fitting) an annular wall 95 having a plurality of slots 96 into which respective appendices 97 of the side wall 6 of the outer casing 2 are snapped, it also comprises an inner annular rim 98 (for the inner fitting) which is snap-inserted under corresponding outer teeth 99 of vertical appendices 100 branching towards the annular edge of the wall 12, somewhat towards the inside from the annular rim 93. Said cover 8 also comprises a lower annular rim 102 which compresses the annular gasket 94 in order to provide a perfect seal inside the container 1, which is in direct communication with the carburettor 10. Because of the fact that by virtue of being snap-connected to the outer casing 2 the cover 8 no longer has a single seating position, the sector 61 which can obstruct either the aperture 39 or 52 is no longer made separate, but is formed integrally with the cover 8, which can thus have two possible fitting positions on the outer casing 2, for obstructing one or other of the apertures 39 or 52 respectively.

Other minor modifications are also made in the container of Figures 14 and 15 with respect to the container of Figures 12 and 13, for example the duct 36 is of tubular form and is connected to the first portion 35, also of tubular form, by snap-insertion of outer appendices 105 of the duct 36 into respective slots 106 in the portion 35. An outer perimetral edge 107 on the duct 36 also acts as a stop for the insertion of the duct 36 into the portion 35.

The embodiment illustrated in Figures 16 and 17 differs from the preceding embodiments in that the outer casing 2 no longer comprises the upper wall 12, and thus the cover 8 is no longer of annular shape but is of circular shape and has a lowered circular central part 110 and an outer annular rim 111 in which there is housed an annular gasket 112 which rests on the upper edge of the cylindrical side wall 6 of the outer casing 2. Two bores 113 are provided in said central part 110, and through which there pass two bolts 114 of sufficient length, these lowerly comprising an annular shoulder 115 which rests on the disc 24 for compressing the annular gasket 19, mounted about the perimetral edge 20 of the aperture 21, against the carburettor 10 when the lower threaded ends 22 are screwed into the corresponding threaded bores in said carburettor 10, whereas at their top, in addition to a hexagonal portion projecting above the cover 8, they comprise a threaded portion 120 on to which are screwed corresponding threaded caps 121, conveniently of plastics construction, which lowerly carry an annular gasket 122 resting in a sealed manner on the surface of the part 110 about the bores 113. The central circular part 110 of the cover 8 then rests on an annular plate 125 fixed about the bolts 114.

Conveniently, the circular central part 110 of the cover 8 comprises a third bore 140 from which there upperly projects a threaded part 141 of a stem fixed to the lower base of the outer casing 2, and also provided with the annular support plate 125 for the cover 8. In this respect, the cover 8 is fixed in a balanced manner on the outer casing 2 by means of a third cap 121 (not shown in Figure 16) which is screwed on to the threaded part 141.

The container for a dry filter element for the air to a carburettor, constructed according to the present invention, can thus be very easily and economically assembled on to the carburettor in a production line, in that the container 1, provided with the outer casing 2, the filter element 5, the already mounted upper cover 8 and the ducts 36 and 51, can be directly fixed on to the carburettor by means of their threaded ends 22, and of which the head is accessible directly from the outside of the container without any need to dismantle any part of the container. This is made possible (in the embodiments of Figures 1 to 15) by providing the upper flat wall 12 facing the lower base wall 3 of the outer casing 2, and on which the bolts 16 rest. In addition, the flat wall 12 is rigidly connected to the lower base wall 3 by means of the columns 13 or legs 90, and the entire assembly is conveniently constructed in a single piece by moulding plastics material, which besides making a certain structural versatility possible relative to containers constructed of sheet metal, also allows a sufficient overall rigidity of the container to be attained with limited material without the need for any special reinforcements, ribs etc. The upper cover 8 can be easily fitted to and removed from the outer casing 2 for replacing the filter element 5 when necessary, and this latter can also be made with its upper annular surface fixed to the bottom of the cover 8, so providing a smaller number of separate component pieces. In addition, the ducts 36 and 51 for feeding the air at different temperatures into the container are easily fitted and removed. The elements 50 provided in the first duct 36 also constitute an economical and conveniently effective means for reducing noise towards the outside of the container 1, originating from the inlet opening to the carburettor. In addition, besides constituting an element for reducing noise towards the outside, the metal mesh element 55 also constitutes a temperature protection device for the duct 51.

In the embodiment of Figures 14 and 15, the fact that the base wall 3 of the outer casing 2 is constructed separately means that it is necessary only to modify the construction of the wall 3 in order to fit the container 1 to carburettors 10 having different connection surfaces.

The embodiment of Figure 16 and 17 has the advantage of being able to mount the container 1 on the carburettor 10 without having to dismantle

the container, it being necessary only to unscrew the two caps 121 and screw the bolts 114 from the outside of the cover 8 in order to fix them into the bores in the carburettor 10, and then rescrew the caps 121 in order to fix the cover 8 in a sealed manner.

Finally, it is apparent that modifications can be made to the described and illustrated embodiments of the container according to the present invention, both to the form and arrangement of the various constituent parts, without leaving the scope of the inventive idea. For example, the system for fixing the upper cover 8 to the outer casing 2 can be made differently, and instead of the bolts 16 and 114 being screwed into bores in the carburettor 10, they can comprise internal threaded bores screwed over threaded shanks projecting from the carburettor 10. Likewise, the duct 36 can be constructed of different shape, and means of known type can also if required be disposed therein for automatically controlling the feed temperature inside the container 1. Various additional pipes and ducts, conveniently of known type, can also be fixed to the container 1.

CLAIMS

1. A container (1) for a dry filter element (5) for the air to a carburettor (10), characterised by comprising means (16; 114) accessible from the outside of said container (1) for its fixing on to said carburettor (10).

2. A container as claimed in claim 1, characterised in that said container (1) comprises an outer casing (2) having two spaced-apart portions (3, 12) of which one (3) is for its substantial support on said carburettor (10), and one (12) is for upperly supporting said means (16) accessible from the outside, said two portions (3, 12) being spaced apart by relative support elements (13, 90).

3. A container as claimed in claim 2, characterised in that said outer casing (2) comprising said two spaced-apart portions (3, 12) and said support elements (13) is constructed in a single piece.

4. A container as claimed in claim 3, characterised in that said outer casing (2) is constructed of plastics material, by moulding.

5. A container as claimed in one of claims 2 to 4, characterised in that said two portions (3, 12) constitute two facing walls, namely a lower and an upper wall, of said container (1).

6. A container as claimed in claim 5, characterised in that said upper wall (12) constitutes an inner perimetral fastening support for an upper cover (8) for said outer casing (2).

7. A container as claimed in claim 6, characterised in that said upper cover (8) is of substantially annular form, and rests with outer perimetral fastening on said outer casing (2).

8. A container as claimed in claim 6 or 7, characterised in that said upper cover (8) can be detached from said outer casing (2) in order to make said filter element (5) accessible, said upper cover (8) being connectable to said outer casing (2) by snap connection means (30, 31, 32, 95, 96, 97; 98, 99, 100) present at least on one of the perimetral fastening portions.

9. A container as claimed in one of claims 2 to 8, characterised in that said means accessible from the outside comprise bolts (16) passing through said container (1), and of which their lower end (22) can be screwed into said carburettor (10) for connection purposes, and their upper end (16) is external to said outer casing (2) in order to enable them to be screwed.

10. A container as claimed in claim 1, comprising an outer casing (2) and a relative upper closure cover (8), characterised in that said means accessible from the outside (114) project upperly from said cover (8) and pass through said container (1) in order to emerge lowerly from said outer casing (2) for its connection to said carburettor (10).

11. A container as claimed in claim 10, characterised in that said means accessible from the outside comprise bolts (114), on to the upper end (120) of which can be screwed caps (121) for fixing said cover (8) on to said outer casing (2).

12. A carburettor as claimed in one of the preceding claims, comprising at least a first fresh air feed duct (36) and a second duct (51) for feeding air at higher temperature, characterised in that said first and/or second duct can be fixed to a connection portion (35; 71) pertaining to the outer casing (2) of said container.

13. A container as claimed in claim 12, characterised in that said first and/or second duct (36, 51) can be fixed by snap connection means (43, 44, 45; 66, 67, 68; 72, 73, 74) to said connection portion (35, 71).

14. A container as claimed in claim 12 or 13, characterised in that said connection portion (35) also partly forms a part (42) of said first and/or second duct.

15. A container as claimed in one of claims 12 to 14, characterised by comprising first means (50) and/or second means (55) disposed in said first and/or second duct (36, 51) respectively, in order to oppose the exit of sound waves from the interior of said container (1) towards the outside.

16. A container as claimed in claim 15, characterised in that said first means (50) comprise a plurality of elements of substantially V cross-section, having their vertex pointing towards the outside of said container and being spaced apart from each other.

17. A container as claimed in claim 16, characterised by comprising a plurality of parallel rows of said elements (50), said elements being offset with respect to each other in successive rows.

18. A container as claimed in one of claims 15 to 17, characterised in that said second means (55) comprise a metal mesh element having a

portion (58) of restricted cross-section, said mesh element also constituting a thermal protection device for said second duct (51).

19. A container for a dry filter element for the air to a carburettor, as described with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1982. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.